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Specification for Turbine oils

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The preparation of this British Standard was entrusted by the Petroleum Standards Committee (PTC/-) to Technical Committee PTC/7 upon which the following bodies were represented:

- Association of Hydraulic Equipment Manufacturers
- British Electrical and Allied Manufacturers' Association (BEAMA)
- British Gas Corporation
- British Gear Manufacturers' Association
- British Lubricants Federation Limited
- British Railways Board
- British Refrigeration and Air Conditioning Association
- Department of Trade and Industry, National Engineering Laboratory
- Electricity Supply Industry in England and Wales
- Engineering Equipment and Materials Users' Association
- Institute of Petroleum
- Institute of Refrigeration
- London Transport Executive
- Ministry of Defence
- Society of British Aerospace Companies Limited
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Foreword

This British Standard which has been prepared under the direction of the Petroleum Standards Committee, was first published in 1933 under the title “*Turbine oils*” and specified straight hydrocarbon oils of petroleum origin, without additives, for use in turbines.

The first revision was published in 1955 under the title “*Steam turbine oils*”, and recognized the need, for this application, for oils containing additives designed to inhibit corrosion of the plant and to retard oxidation of the oil. Besides specifying such treated oils by description it introduced new tests to suit these additive-containing oils. Amendments to this standard, of an essentially editorial character, were issued in 1956 and 1958.

The second revision, in 1968, incorporated changes that had been made in relevant Institute of Petroleum methods of test and also permitted, by agreement between purchaser and vendor, a reduction in the severity of the test for rust-preventing characteristics through the use of distilled water in place of synthetic sea water as the rusting agent. Grade designations in accordance with BS 4231:1967 were introduced, the viscosity limits of the oils being slightly adjusted to fit them, and the demulsification number maxima were slightly raised for the two highest viscosity grades. An amendment to this standard, issued in 1972, eliminated the qualitative designations “medium”, “heavy” etc. leaving reference only to the viscosity grade numbers of BS 4231.

The international classification based on BS 4231:1967 was subsequently adopted by amendment in 1977.

The 1974 revision introduced limits for oxidation stability expressed as total oxidation products (TOP) based on the method of test developed by the Conférence Internationale des Grands Réseaux Electriques (CIGRE) and adopted by the Institute of Petroleum as IP 280 (BS 5095)¹⁾. Two optional supplementary oxidation tests with and without a copper catalyst were included as an appendix. Limits were also introduced for foaming characteristics and air release value using methods developed for lubricating oils.

The present revision retains the limits for oxidation stability in terms of TOP but changes the limit for sludge and the way in which it is defined. The optional supplementary oxidation tests in the appendix to the 1974 edition, which is now withdrawn, have been deleted from this edition. The specification of limits for foaming characteristics and air release value has been retained but the limits have been modified for certain grades.

The requirements formerly covered in Public Authority Standard PAS 5:1975 “*Specification for mineral turbine oils*” have been incorporated into this edition of BS 489 and PAS 5 is therefore superseded by this standard.

In recent years there has been interest in the use of IP 331B “*Stability corrosion test for non-aqueous fire resistant fluids for testing rust and oxidation inhibited oils for use in “wet” environments*”. Work is currently in progress to show the relevance of this test to turbine oils and due consideration will be given to its introduction into this standard, in place of the catalysed BS 5301 test sequence, when the work is complete.

Experiences with turbine oils complying with this specification have shown that reactions can occur between the additives they may contain and process gases in turbines handling such gases. It is essential that users wishing to use turbine oils for process applications should check with suppliers that the oils supplied are suitable for any specific processes.

¹⁾ Superseded by BS 2000-280.